Docket No.: 3430-0105P
(Patent)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Patent Application of:	Jeongmin MOON		
Application No.:	09/589,881	Confirmation No.:	1734
Filed:	June 9, 2000	Art Unit:	2871
For:	REFLECTIVE LIQUID CRYSTAL DISPLAY DEVICE HAVING AN AUXILIARY LIGHT SOURCE DEVICE WITH A UNIFORM LIGHT DISTRIBUTION	Examiner:	H. C. Nguyen

APPEAL BRIEF

MS Appeal Brief-Patent
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

As required under § 41.37(a), this brief is filed within one month of the December 27, 2011 mailing date of the Notice of Appeal Panel Decision from Pre-Appeal Brief Review, and is in furtherance of said Notice of Appeal. The December 27, 2011 mailing date of the aforementioned Notice is more than two months after the August 5, 2011 date on which the Request for a Pre-Appeal Brief Conference Request was filed.

The fees required under § 41.20(b)(2) are dealt with in the accompanying TRANSMITTAL OF APPEAL BRIEF.

This brief contains items under the following headings as required by 37 C.F.R. § 41.37 and M.P.E.P. § 1206:

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I. Real Party in Interest

The real party in interest for this Application is LG Display CO., LTD., as evidenced by an Assignment recorded on June 9, 2000 at Reel 010857, Frame 0490.

II. Related Appeals and Interferences

To the best of Appellant's knowledge, there are no other prior or pending appeals of this Application, or patent interference proceedings, or judicial proceedings which may be related to, directly affect, or be directly affected by, or have a bearing on the Board's decision of this Appeal.

III. Status of Claims

In the Application on appeal, claims 1, 2, 6-11, 14-18, 21 and 24-27 are present in this application. Claims 1, 10, 11 and 21 are independent. Claims 3-5, 12, 13, 19, 20, 22 and 23 have been canceled by amendment.

Claims 1, 2, 6-9, 11, 14-18, 21, 24 -25 and 27 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,259,854 to Shinji et al. ("Shinji") in view of U.S. Patent 5,575,549 to Ishikawa et al. ("Ishikawa").

Claim 10 stands rejected under 35 USC §103(a) as being unpatentable over EP 08879720 to Funamoto et al. ("Funamoto") in view of Shinji and Ishikawa.

Claim 26 stands rejected under 35 USC §103(a) as being unpatentable over Funamoto in view of Ishikawa and further in view of Shinji.

IV. Status of Amendments

The RCE Amendment filed on December 17, 2010 has been entered.

V. Summary of the Claimed Subject Matter

Claim 1 recites an auxiliary light source device for a reflective liquid crystal display device having a reflector (e.g., 507 in Fig. 4A), the auxiliary light source device comprising: a light source (e.g., 503, or 503 and 505 in Fig. 4A); and a light directing member (e.g., 501 in Fig. 4A) for directing incident light from the light source (e.g., 503 or 503 and 505) toward the reflector (e.g., 507, shown, for example, in Fig. 4A) outwardly along an orthogonal direction (shown by an arrow directed vertically downward in Fig. 4A, for example), the light directing member (e.g., 507) including, an upper surface (e.g., 502 in Fig. 4A) and a lower surface (e.g., 509 in Fig. 4a) parallel to each other, the lower surface (e.g., 509) having a plurality of convex portions (shown in Fig. 4A, and labeled, e.g., ADB in Fig. 3) extending from the lower surface (e.g., 509) , each of the convex portions (shown, e.g., in Fig. 4A and labeled, e.g., ADB in Fig. 3) having a substantially planar surface (shown, e.g., as 511 in Fig. 4A, and labeled, e.g., D in Fig. 3) which is substantially parallel to the lower surface (e.g., 509 in Fig. 4A) and a side surface (shown, for example, in Fig. 4A and labeled, e.g., A or B in Fig. 3) connecting the planar surface (shown, e.g., as 511 in Fig. 4A and labeled, e.g., D in Fig. 3) and the lower surface (e.g., 509 in Fig. 4A), and a side surface angle (e.g., 523 in Fig. 5) between the side surface of the convex portion and a line perpendicular to the substantially planar surface (where perpendicular dashed lines are shown, for example, in Fig. 5) is less than 5° (disclosed, e.g., on page 6, lines 15-21), wherein the plurality of convex portions (shown in Fig. 4A and labeled, e.g., ADB in Fig. 3) have the same side surface angle with each other, wherein light reflected along an orthogonal direction to the liquid crystal display device is uniform and wherein a size of the plurality of convex portions increases with increasing distance from the light source (as discussed, for example, on page 5, lines 21-24 and on page 6, lines 8-14, and as shown, for example, in Figs. 4A and 4B).

Claim 10 recites a reflective liquid crystal display device, comprising: a display panel including two substrates spaced apart, liquid crystal sandwiched between the two substrates, and a reflector (e.g., 507 in Fig 4A) to reflect light through the liquid crystal; an auxiliary light source device for supplying light to the display panel, including, a light source (e.g., 503 in Fig. 4A) , a light directing member (e.g., 501 in Fig. 4A) for directing incident light from the light source (e.g., 503 or 503 and 505) toward the display panel, the light directing member (e.g., 501) having an upper surface (e.g., 502 in Fig. 4A) and a lower surface (e.g., 509 in Fig. 4A) parallel to each

other, the lower surface (509) having a plurality of convex portions (shown, e.g., in Fig. 4A and labeled e.g., ADB in Fig. 3) each having a substantially planar surface (shown, e.g., as 511 in Fig. 4A and labeled, e.g., as D in Fig. 3) which is substantially parallel to the lower surface and a side surface (shown, e.g., in Fig. 4A and labeled, e.g., A or B in Fig. 3) connecting the planar surface and the lower surface, a side surface angle between the side surface of the convex portion and a line perpendicular to the substantially planar surface (e.g., 523 in Fig.5, where dashed perpendicular lines are shown, e.g., in Fig. 5) being less than 5° (disclosed, e.g., on page 6, lines 15-21), wherein the plurality of convex portions (shown, e.g., in Fig. 4A and labeled, e.g., ADB in Fig. 3) have the same side surface angle with each other, wherein light reflected along an orthogonal direction to the display panel is uniform, and wherein a size of the plurality of convex portions increases with increasing distance from the light source (as discussed, e.g., on page 5, lines 21-24 and on page 6, lines 8014, and as shown, for example, in Figs. 4A and 4B) ; and a light reflecting member (e.g., 505 in Fig. 4A) which guides light from the light source into the light directing member, said display panel being between said auxiliary light source and said light reflecting member (as shown, for example, in Fig. 4A).

Claim 11 recites an auxiliary light source device for a reflective liquid crystal display device having a reflector (e.g., 507 in Fig. 4A), the auxiliary light source device (e.g., 501 in Fig. 4A) comprising: an upper reflective surface (e.g., 502 in Fig. 4A) to reflect impinging light above a certain incidence angle; a lower reflective surface (e.g., 509 in Fig. 4A) parallel to the upper reflective surface, the lower reflective surface (e.g., 509) having a plurality of convex portions (shown, e.g., in Fig. 4A and labeled, e.g., ADB in Fig. 3) extending toward the reflector (e.g., 507) to direct light from the auxiliary light source device to the reflector outwardly along an orthogonal direction (as shown, for example, by a downwardly directed vertical arrow in Fig. 4); and an entry surface (shown, e.g., in Fig. 4A as the side of 501 adjacent to the light source 503, which and corresponding to, for example, side labeled 67a in Fig. 1), connecting the upper and lower reflective surfaces (e.g., 502 and 509, respectively, in Fig. 4A) through which light from a light source (e.g., 503 in Fig. 4A(enters, wherein each convex portion includes a planar portion (e.g., 511) in Fig. 4A) which is substantially parallel to the lower reflective surface (e.g., 509 in Fig. 4A) and side surfaces (shown, e.g., in Fig. 4A corresponding to, e.g., A and B in Fig. 3) connecting the planar portion (e.g., 511) with the lower reflective surface (e.g.,509) and a side

surface angle (e.g., 523 in Fig. 5) between the side surfaces and a line perpendicular to the planar surface is less than 5° (disclosed, e.g., on page 6, lines 15-21) wherein the plurality of convex portions have the same side surface angle with each other, wherein light reflected along an orthogonal direction to the liquid crystal display device is uniform, and wherein a size of the plurality of convex portions increases with increasing distance from the light source (discussed, e.g., on page 5, lines 21-24 and on page 6, lines 8-14, and as shown, e.g., in Figs. 4A and 4B).

Claim 21 recites an auxiliary light source device for a reflective liquid crystal display device having a reflector (e.g., 507 in Fig. 4A), the auxiliary light source device comprising: a light source (e.g., 503 or 503 and 505 shown, for example, in Figs. 4A and 4B) extending along a width of the reflector, to emit light along a length of the reflector (as shown, for example, in Figs. 3-5); and a light directing device (e.g., 501 in Fig. 4A) located above the reflector (e.g., 507 in Fig. 4A) and adjacent to the light source to direct light from the light source to the reflector outwardly along an orthogonal direction such that a light distribution of light directed by the light directing device is substantially uniform along the length of the reflector (as discussed, for example, on page 5, lines 21-24 and on page 6, lines 8-14, and as shown, e.g., in Figs. 4A and 4B), and such that the directed light is substantially perpendicular to the reflector (as shown, for example, by a downwardly directed vertical arrow in Fig, 4A), and the light directing device includes an upper surface, a lower surface parallel to the upper surface and a plurality of portions each extending from the lower surface toward the reflector at a 90° angle with respect to the lower or upper surface (as discussed for example, in the disclosure regarding Fig. 5, on page 6, lines 154-21, which includes a zero degree side angle) such that the light reflected outwardly along an orthogonal direction to the liquid crystal display device is uniform (as discussed, for example, on page 5, lines 21-24 and on page 6, lines 8-14, and as shown, e.g., in Figs. 3-5), wherein each portion includes a planar surface (e.g., 511 and 611 in Figs, 4A, 4B and 5) which is substantially parallel to the lower surface, and wherein a size of the plurality of portions increases with increasing distance from the light source (as shown, for example, in Figs. 4A and 4B).

VI. Grounds of Rejection to be Reviewed.

Claims 1, 2, 6-9, 11, 14-18, 21 , 24 -25 and 27 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,259,854 to Shinji et al. ("Shinji") in view of U.S. Patent 5,575,549 to Ishikawa et al. ("Ishikawa").

Claim 10 stands rejected under 35 USC §103(a) as being unpatentable over EP 08879720 to Funamoto et al. ("Funamoto") in view of Shinji and Ishikawa.

Claim 26 stands rejected under 35 USC §103(a) as being unpatentable over Funamoto in view of Ishikawa and further in view of Shinji.

VII. Argument

Appellant respectfully submits that the three outstanding rejections of record are without merit for at least the reasons presented, below.

BACKGROUND

By way of background, Applicant notes that the present invention is directed to an auxiliary light source device for a reflective liquid crystal display device which achieves highlight utilization efficiency and improved display characteristics. The device of the present invention includes a light source and a light directing member for directing incident light from the light source toward a reflector, outwardly along an orthogonal direction. The light directing member includes upper and lower surfaces which are disposed parallel to each other, with side surfaces connecting the upper and lower surfaces. In one of the advantageous features of the present invention, the side surface angle between the side surfaces and a line perpendicular to the planar portion is less than 5°. With reference to Fig. 3 of the present application, the angles θa and θb between the surfaces A and C and between the surfaces B and C, respectively, are less than 5°. Thus, the convex portion of the lower surface, which can alter the incident angle of reflective light to an angle less than 5 °, is relatively easy to manufacture. Fig. 5 of the present application shows an enlarged view of the lower portion of the light directing member. As shown in Fig. 5, it is preferable that an angle 523 between the side surfaces 515 or 517 and a line perpendicular to surfaces 511 and 513 falls within the range of about between 0° and 10°. Because of the disposition of the side surfaces 515 and 517 of the convex portions relative to the upper and lower surfaces 513 and 511, respectively, which as defined in claims 1, 10 and 11 has an angle of less than 5°, the light which strikes a side of one of the convex portions is directed downwardly, substantially perpendicular to the reflector 507.

DISCUSSION

Shinji, the base reference used in the final rejection of claims 1, 2, 6-9, 11, 14-18, 21 , 24 -25 and 27 does not disclose or even remotely suggest the beneficial results and importance of defining the angle of the light-reflecting side walls of a light directing member as defined by the claims of the present invention. In fact, the Shinji reference explicitly teaches away from the present invention in its disclosure in col. 7, lines 34-37, that the trapezoidal pattern advantageously has an angle of between 10° and 30° to achieve a large ray utility factor and to reduce loss. Also, Table 1 of the prior art reference appears to support this disclosure showing, in all of the embodiments, slope angles of 20° to 25°. Significantly, Shinji states, in col. 7, lines 5-13, that when the slope angle is zero degrees

or 2 degrees, the scattering reflection efficiency is less than one and is bad even when the height to width ratio is equal to or greater than 0.6, thereby teaching away from using slope angles less than 5 degrees. In fact, Shinji explicitly advocates using slope angles greater than 5 degrees.

Despite the fact that Shinji so clearly teaches away from the claimed invention which limits the angle of the light-reflecting side walls of a light directing member, the final Office Action completely disregards these teachings, which one of ordinary skill in the art would not be expected to do.

Applicant respectfully submits that, because of Shinji's explicit teachings away from the claimed invention, and because Shinji completely fails to disclose the importance of controlling the angles of the side surfaces of the convex portions of the light directing member in the limited range that is claimed, one of ordinary skill in the art would not be properly motivated to disregard such fundamental teachings to arrive at, suggest, or otherwise render obvious the claimed invention.

In fact, Appellant respectfully submits that one of ordinary skill in the art would have to substantially reconstruct and redesign the fundamental structure of Shinji to arrive at the claimed invention. Cf., *In re Ratti*, 123 USPQ 349 (CCPA 1959).

Furthermore, Shinji clearly, unmistakably and unequivocally teaches away from the claimed invention and, because of this, Shinji cannot be used to render the claimed invention obvious under 35 USC §103(a). A reference may be said to teach away from the proposed claimed invention when a person of ordinary skill in the art, upon reading the reference, would be discouraged from following the path set out in the reference, or would be led in a direction divergent from the path that was taken by Applicant. The degree of teaching away will, of course, depend on the particular facts. In general, a reference will teach away if it suggests that the line of development flowing from the reference's disclosure is unlikely to be productive of the result sought by the applicant, *In re Gurley,* 27 F.3d 551, 553 (Fed. Cir. 1994).

Applicant respectfully submits that, after reading Shinji, one of ordinary skill in the art would clearly be discouraged from making an auxiliary light source device for a reflective liquid crystal display with a light directing member having the characteristics recited in the claims, which include a light directing member for directing incident light from the light source toward the reflector outwardly along an orthogonal direction, the light directing member including an upper surface and a lower surface parallel to each other, the lower surface having a plurality of convex portions extending from the lower surface, each of the convex portions having a substantially planar surface

which is substantially parallel to the lower surface and a side surface connecting the planar surface and the lower surface, and a side surface angle between the side surface of the convex portion and a line perpendicular to the substantially planar surface is less than 5°, wherein the plurality of convex portions have the same side surface angle with each other, wherein light reflected along an orthogonal direction to the liquid crystal display device is uniform, and wherein a size of the plurality of convex portions increases with increasing distance from the light source.

Additionally, reference to Table I reveals that the embodiment having the lowest average luminance and the second lowest uniformity ratio of luminance is comparative embodiment 1, which is the only disclosed embodiment with a slope angle less that 5 degrees. This clearly evidence of a substantial teaching away of using slope angles of less than 5 degrees.

Turning to the Ishikawa patent, which is used as the first applied secondary reference in the rejection of claims 1, 2, 6-9, 11, 14-18, 21 and 24, one sees that Ishikawa is directed to providing a light conductor which only achieves its uniform illumination by using a plurality of cavities in a lower light conducting surface where those cavities are all filled with a light scattering material 6. Thus, Ishikawa operates using a fundamentally different mechanism than does Shinji, which does not rely whatsoever on using a separate light scattering medium but, instead, relies on the light reflection and refraction properties of a light conductor alone, i.e., without the need to add an additional light scattering medium and make it a part of the light conductor.

In other words, Shinji does not disclose or suggest or render obvious the claimed invention, including the specifically limited shape of Shinji's protrusions, and one of ordinary skill in the art would have no proper incentive to turn to Ishikawa to change the shape of those protrusions.

The fact that Ishikawa discloses, in connection with its Fig. 30, that the size of the cavities filled with light scattering material 6 increases with increasing distance from the light source has no bearing whatsoever on the fact that its fundamental difference of operation to achieve uniform brightness, i.e., a separate light scattering material filling the cavities, teaches away from one of ordinary skill in the art to even turn to Ishikawa to modify the Shinji light conductor shape at all.

Another way of saying this is that Ishikawa does not disclose that changing its teaching of the size of its cavities the farther away they are from the light source would in any way motivate one of ordinary skill in the art to modify Shinji's fundamentally different protrusion side wall characteristics to arrive at, or otherwise render obvious the claimed invention, which limits the slope angles of the side walls of those protrusions. Thus, the final Office Action fails to make out a *prima*

facie case of proper motivation to modify the size of Shinji's protrusions regardless of the distance that they are located from the light source.

Accordingly, the Office Action fails to make out a *prima facie* case that one of ordinary skill in the art would turn to Ishikawa to modify Shinji's light distribution element at all, let alone as suggested in this rejection.

Accordingly, in view of the negative teachings present in the Shinji reference concerning slope angles of less than 5 degrees, and in view of a total lack of appreciation of the importance of controlling the angles of the side surfaces of the convex portions of the light directing member, it would not be obvious to combine the teachings of the respective references without completely reconstructing the teachings of the references in view of the Applicants' own disclosure.

To the extent that the Office Action indicates that Shinji has built the embodiments where the slope angle is zero degrees and 2 degrees, Applicant submits that this is only speculative conjecture. All that Shinji discloses in this regard is to discuss how bad scattering reflection efficiency is when the slope angles are zero or 2 degrees. This does not constitute an inherent disclosure (i.e., not just possibly disclosed and not just probably disclosed, but necessarily disclosed) of actually constructed physical embodiments. Applicant respectfully submits that it may be possible that computer simulations were made to serve as the basis for this disclosure. In this regard, however, Applicant points out that for something to be inherently disclosed, it cannot be just possibly disclosed nor can it be probably disclosed. Rather, it must be necessarily disclosed. See, in this regard, *In re Oelrich*, 666 F.2d 578, 581, 212 USPQ 323, 326 (CCPA 1981) and *In re Rijckaert*, 9 F.3d 1531, 1534, 28 USPQ2d 1955, 1957 (Fed. Cir. 1993). Moreover, it is well settled that a rejection under 35 U.S.C. § 103 cannot be based on speculation. See *In re Warner*, 379 F.2d 1011, 1017, 154 USPQ 173, 178 (CCPA 1967), *cert. denied*, 389 U.S. 1057 (1968). See, also, *In re GPAC, Inc.*, 35 USPQ2d 1116 at 1123 (Fed. Cir. 1995) and *Ex parte Haymond*, 41 USPQ2d 1217 at 1220 (Bd. Pat. App. & Int. 1996).

With respect to the rejections of claims 10 and 26, the final Office Action relies on Funamoto as the primary reference to reject those claims.

An inspection of Funamoto reveals that there appears to be no recognition in the Funamoto reference of the advantages to be achieved by controlling the side surface angles of the convex portions of the light directing member as defined by the claims of the present application.

In this regard, Funamoto's Fig. 10 discloses no measurement data about its light guide plate, i.e., no angle data, no height data, and no width data regarding its projections. Also, there is no statement by Funamoto that it achieves light uniformity. In fact, in Funamoto's first disclosed

embodiment, only a 10 percent uniformity of the incident beam is disclosed – see, for example, the fifth-to-last paragraph of the specification discussing the "first embodiment." Moreover, with respect to the embodiment of Fig. 10 (third embodiment), Funamoto focuses on cross-sectional shapes of its projections, referencing Figs. 12A, 12B and 13, and not at all on the claimed angular shape of the protrusions as they extend away from the bottom face of the light guide.

Thus, Funamoto has no disclosure of the claimed invention whatsoever.

Moreover, neither of the secondary references, i.e., Ishikawa and Shinji, discloses the protrusion slope angle features of the claimed invention missing from Funamoto, so no matter how these two references are applied to modify Funamoto, there is insufficient basis in all three of these applied references to arrive at or otherwise render obvious the claimed invention.

Responses to Examiner's Arguments:

It is respectfully submitted that Applicant has not ignored the conditions of the width and height of the Shinji light conductor. Shinji teaches that the slope angle is zero or 2 degrees "even when" the height to width ratio is equal to or greater than 0.6, which appears to mean that a height to width ratio which is equal to or greater than 0.6 is an optimum condition and a height to width ratio of less that 0.6 is not optimum so that the scattering reflection ratio is less than one for any height to width ratio in Shinji's light conductor. In this regard, the Office has not presented any evidence that if the height to width ratio is less than 0.6, that the scattering reflection ratio would be greater than one.

Applicant also notes that, while Applicant does not recite a quantitative value of light scattering or of light uniformity, whether they do so or do not do so is not relevant to the fact that one of ordinary skill in the art would clearly not be properly motivated to employ a slope angle less than 5 degrees and, therefore, the claimed invention, which specifies the slope angle is not rendered obvious regardless of reciting any quantitative value(s) of light scattering or of light uniformity. Moreover, the Office Action fails to explain why Applicant has to disclose or claim quantitative scattering reflection efficiency values when an applicant is entitled to claim what he (or she) regards as his (or her) invention, as required by the patent statutes.

Applicant also respectfully submits that Shinji's numerous graphs show calculations and no statement is made that actual experimental results serve as the basis for these calculation, which means to Applicant that the Office Action does not make out a *prima facie* case that Shinji actually made an embodiment which discloses, or renders obvious the claimed invention. In fact, because Shinji explicitly teaches that projections with the claimed slope angle are "bad," Shinji clearly

teaches away from the claimed invention. In this regard, please note the poor results when the slope angle is small (col. 7, lines 5-13, for example).

Accordingly, in view of the above remarks, the rejections should be reversed, and claims 1-2, 6-11, 14-18, 21, and 24-27 of the present application should be allowed.

If necessary, the Director is hereby authorized in this, concurrent, and future replies to charge any fees required during the pendency of the above-identified application or credit any overpayment to Deposit Account No. 02-2448.

Dated:

JAN 27 2012

Respectfully submitted,

By _____

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APPENDIX A: CLAIMS

1. (Previously Presented) An auxiliary light source device for a reflective liquid crystal display device having a reflector, the auxiliary light source device comprising:

a light source; and

a light directing member for directing incident light from the light source toward the reflector outwardly along an orthogonal direction, the light directing member including,

an upper surface and a lower surface parallel to each other, the lower surface having a plurality of convex portions extending from the lower surface, each of the convex portions having a substantially planar surface which is substantially parallel to the lower surface and a side surface connecting the planar surface and the lower surface, and a side surface angle between the side surface of the convex portion and a line perpendicular to the substantially planar surface is less than 5°, wherein the plurality of convex portions have the same side surface angle with each other, wherein light reflected along an orthogonal direction to the liquid crystal display device is uniform, and wherein a size of the plurality of convex portions increases with increasing distance from the light source.

2. (Original) The device according to claim 1, further comprising:

a light reflecting member to guide light from the light source into the light directing member.

Claims 3-5. (Cancelled)

6. (Previously Presented) The device according to claim 1, wherein the planar surface of each convex portion has a substantially circular shape.

7. (Original) The device according to claim 1, wherein the planar surface of each convex portion has a rectangular shape.

8. (Original) The device according to claim 1, wherein the plane surface of the plurality of convex portions has a bar shape extending perpendicular to a direction of light propagation in the light directing member.

9. (Original) The device according to claim 1, wherein a distance between the lower surface and the planar surface of the each convex portion is less than 50μm.

10. (Previously Presented) A reflective liquid crystal display device, comprising:

a display panel including two substrates spaced apart, liquid crystal sandwiched between the two substrates, and a reflector to reflect light through the liquid crystal;

an auxiliary light source device for supplying light to the display panel, including,

a light source,

a light directing member for directing incident light from the light source toward the display panel, the light directing member having an upper surface and a lower surface parallel to each other, the lower surface having a plurality of convex portions, each having a substantially planar surface which is substantially parallel to the lower surface and a side surface connecting the planar surface and the lower surface, a side surface angle between the side surface of the convex portion and a line perpendicular to the substantially planar surface being less than 5°, wherein the plurality of convex portions have the same side surface angle with each other, wherein light reflected along an orthogonal direction to the display panel is uniform, and wherein a size of the plurality of convex portions increases with increasing distance from the light source; and

a light reflecting member which guides light from the light source into the light directing member, said display panel being between said auxiliary light source and said light reflecting member.

11. (Previously Presented) An auxiliary light source device for a reflective liquid crystal display device having a reflector, the auxiliary light source device comprising:

an upper reflective surface to reflect impinging light above a certain incidence angle;

a lower reflective surface parallel to the upper reflective surface, the lower reflective surface having a plurality of convex portions extending toward the reflector to direct light from the auxiliary light source device to the reflector outwardly along an orthogonal direction; and

an entry surface connecting the upper and lower reflective surfaces through which light from a light source enters, wherein each convex portion includes a planar portion which is substantially parallel to the lower reflective surface and side surfaces connecting the planar portion with the lower reflective surface, and a side surface angle between the side surfaces and a line perpendicular to the planar surface is less than 5°, wherein the plurality of convex portions have the same side surface angle with each other, wherein light reflected along an orthogonal direction to the liquid crystal display device is uniform, and wherein a size of the plurality of convex portions increases with increasing distance from the light source.

Claims 12-13. (Cancelled)

14. (Previously Presented) The device according to claim 11, wherein the planar portion is substantially parallel to the lower reflective surface.

15. (Original) The device according to claim 11, wherein a cross section of each convex portion is substantially circular.

16. (Original) The device according to claim 11, wherein a cross section of each convex portion is rectangular.

17. (Original) The device according to claim 11, wherein each convex portion extends along substantially an entire width of the reflective liquid crystal display device.

18. (Original) The device according to claim 11, wherein the plurality of convex portions are spaced along the lower surface to ensure a uniform distribution of light along a length of the device.

Claims 19-20. (Cancelled)

21. (Previously Presented) An auxiliary light source device for a reflective liquid crystal display device having a reflector, the auxiliary light source device comprising:

a light source extending along a width of the reflector, to emit light along a length of the reflector; and

a light directing device located above the reflector and adjacent to the light source to direct light from the light source to the reflector outwardly along an orthogonal direction such that a light distribution of light directed by the light directing device is substantially uniform along the length of the reflector, and such that the directed light is substantially perpendicular to the reflector, and the light directing device includes an upper surface, a lower surface parallel to the upper surface and a plurality of portions each extending from the lower surface toward the reflector at a 90° angle with respect to the lower or upper surface such that the light reflected outwardly along an orthogonal direction to the liquid crystal display device is uniform, wherein each portion includes a planar surface which is substantially parallel to the lower surface, and wherein a size of the plurality of portions increases with increasing distance from the light source.

Claims 22-23. (Cancelled)

24. (Previously Presented) The device according to claim 21, wherein each of the plurality of portions includes a planar surface parallel to a lower surface of the light directing device and connected to the lower surface by at least one side oriented substantially perpendicular to the lower surface.

25. (Previously Presented) The auxiliary light source device of claim 1, wherein the angle between the side surface and a line perpendicular to the planar surface is about between 0° and 10°.

26. (Previously Presented) The auxiliary light source device of claim 10, wherein the angle between the side surface and a line perpendicular to the planar surface is about between 0° and 10°.

27. (Previously Presented) The auxiliary light source device of claim 11, wherein the angle between the side surface and a line perpendicular to the planar surface is about between 0° and 10°.

APPENDIX B: EVIDENCE

(None)

APPENDIX C: RELATED PROCEEDINGS

(None)